

10 / 507147
DT04 Rec'd PCT/PTO 16 SEP 2004

Amendments to the Claims

This listing of claims will replace the originally filed claims in the application.

Listing of Claims:

Claims 1 – 13 (cancelled).

Claim 14 (new): A method for operating a cryogenic tunnel through which products to be chilled or deep-frozen pass, which tunnel is equipped with means for injecting a cryogenic fluid as well as means for extracting, at a variable rate, some of the cold gases resulting from the vaporization of said fluid in the tunnel, wherein:

- a) obtaining a gas temperature, wherein said gas temperature comprises a value selected from the group consisting of the temperature of the gases in proximity to the entry to the tunnel, and the temperature of the gases in proximity to the exit to the tunnel, wherein said gas temperature is obtained from at least one gas temperature probe which is provided outside the tunnel, at a location selected from the group consisting of proximity to the tunnel entrance, and proximity to the tunnel exit;
- b) obtaining an ambient temperature, wherein said ambient temperature is obtained from at least one ambient temperature probe which is provided outside the tunnel;
- c) determining a first delta, wherein said first delta is the difference between said ambient temperature and said gas temperature;
- d) comparing the value of said first delta with a first setpoint value; and,
- e) controlling the extraction rate of said extraction means by feedback as a function of the result of the comparison in step d), in order to restore the value of said first delta to said setpoint value if necessary.

Claim 15 (new): The operating method of claim 14, wherein two or more said ambient temperature probes are provided, and an average ambient temperature is obtained therefrom.

Claim 16 (new): The operating method of claim 15, wherein an entrance gas temperature is obtained from said gas temperature probe which is located outside the tunnel at a location in proximity to the tunnel entrance, a exit gas temperature is obtained from said gas temperature probe which is located outside the tunnel at a location in proximity to the tunnel exit, and wherein an average gas temperature is the average temperature obtained therefrom.

Claim 17 (new): The operating method of claim 16, wherein said first delta is the difference between said average ambient temperature and said average gas temperature.

Claim 18 (new): The operating method of claim 14, wherein said feedback is performed by a PID system.

Claim 19 (new): The operating method of claim 14, wherein one or more gas equilibration valves are provided inside the tunnel, which are capable of directing the cold gases to the entry or the exit of the tunnel and wherein said equilibration valves can be actuated automatically from outside the tunnel.

Claim 20 (new): The operating method of claim 19, further comprising:

- f) obtaining an entrance gas temperature, wherein said entrance gas temperature is obtained from at least one gas temperature probe provided outside the tunnel, in proximity to its exit;
- g) obtaining an exit gas temperature, wherein said exit gas temperature is obtained from at least one gas temperature probe provided outside the tunnel, in proximity to its entry;
- h) determining a second delta, wherein said second delta is the difference between said entrance gas temperature and said exit gas temperature,
- i) comparing the value of the said second delta with a second setpoint value; and,
- j) controlling the orientation of some or all of said equilibration by feedback as a function of the result of the comparison in step h), in order to direct some or all of the cold gases contained in the tunnel so as to restore the value of said temperature difference to said second setpoint value if necessary.

Claim 21 (new): The operating method of claim 20, wherein two or more said exit temperature probes are provided, and an average exit temperature is obtained therefrom.

Claim 22 (new): The operating method of claim 21, wherein two or more said entrance probes are provided, and an average entrance temperature is obtained therefrom.

Claim 23 (new): The operating method of claim 22, wherein said second delta is the difference between said average exit temperature and said average entrance temperature.

Claim 24 (new): The operating method of claim 20, wherein said feedback is performed by a PID system.

Claim 25 (new): The operating method of claim 14, wherein said extraction means on which the feedback is carried out comprises a single extraction line located inside the tunnel, substantially above the region where the products enter.

Claim 26 (new): A device for operating a cryogenic tunnel through which products to be chilled or deep-frozen pass, which tunnel is equipped with means for injecting a cryogenic fluid as well as means for extracting, at a variable rate, some or all of the cold gases resulting from the vaporization of said fluid in the tunnel, comprising:

- a) at least one gas temperature probe located outside the tunnel, in proximity to its a location selected from the group consisting of the tunnel entry and the tunnel exit, wherein said gas temperature probe is capable of providing a gas temperature value, wherein said gas temperature comprises a value selected from the group consisting of the temperature of the gases in proximity to the entry to the tunnel, and the temperature of the gases in proximity to the exit to the tunnel;
- b) at least one ambient temperature probe located outside the tunnel, which is capable of providing an ambient temperature value of the premises where the tunnel is operating; and
- c) a data acquisition and processing unit capable of determining a first delta, wherein said first delta is the difference between said ambient temperature and said gas, of comparing the value of the first delta with a first setpoint value, and of controlling the extraction rate of said extraction means by feedback as a function of the result of said comparison, in order to restore the value of said temperature difference to said first setpoint value if necessary.

Claim 27 (new): The operating device of claim 26, wherein two or more said ambient temperature probes are provided, and an average ambient temperature is obtained therefrom.

Claim 28 (new): The operating device of claim 27, wherein an entrance gas temperature is obtained from said gas temperature probe which is located outside the tunnel at a location in proximity to the tunnel entrance, a exit gas temperature is obtained from said gas temperature probe which is located outside the tunnel at a location in proximity to the tunnel exit, and wherein an average gas temperature is the average temperature obtained therefrom.

Claim 29 (new): The operating device of claim 28, wherein said first delta is the difference between said average ambient temperature and said average gas temperature.

Claim 30 (new): The operating method of claim 26, wherein said feedback is performed by a PID system.

Claim 31 (new): The operating device as claimed in claim 26, wherein said operating device further comprises one or more gas equilibration valves inside the tunnel, which are capable of directing the cold gases to the entry or the exit of the tunnel and can be actuated automatically from outside the tunnel.

Claim 32 (new): The operating device of claim 30, further comprising:

- a) at least one gas temperature probe located outside the tunnel, in proximity to its exit, which is capable of providing an entrance gas, and at least one gas temperature probe located outside the tunnel, in proximity to its entry, which is capable of providing an exit gas temperature; and
- b) a data acquisition and processing unit capable of determining a second delta, wherein said second delta is the difference between said exit gas temperature and said entrance temperature, of comparing the value of the second delta with a second setpoint value, and of controlling the orientation of some or all of said equilibration valves by feedback as a function of the result of the previous comparison, in order to direct some or all of the cold gases contained in the tunnel so as to restore the value of said second delta to said second setpoint value if necessary.

Claim 33 (new): The operating method of claim 32, wherein two or more said exit temperature probes are provided, and an average exit temperature is obtained therefrom.

Claim 34 (new): The operating method of claim 33, wherein two or more said entrance probes are provided, and an average entrance temperature is obtained therefrom.

Claim 35 (new): The operating method of claim 34, wherein said second delta is the difference between said average exit temperature and said average entrance temperature.

Claim 36 (new): The operating method of claim 32, wherein said feedback is performed by a PID system.

Claim 37 (new): The operating device as claimed in claim 26, wherein said extraction means on which the feedback is carried out comprise a single extraction line located inside the tunnel, substantially above the region where the products enter.

Claim 38 (new): A cryogenic tunnel of the type through which products to be chilled or deep-frozen pass, which is equipped with means for injecting a cryogenic fluid as well as means for extracting, at a variable rate, some or all of the cold gases resulting from the vaporization of said fluid in the tunnel, wherein said cryogenic tunnel comprises an operating device as claimed in claim 26.